

Full Report

Firefighter Fatalities in the United States -- 2009

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2009 Experience

In 2009, a total of 82 on-duty firefighter deaths occurred in the U.S. This is a sharp drop from the 105 on-duty deaths that occurred in the U.S. in 2008, and the lowest annual total since 79 deaths in 1993.¹ The average number of deaths annually over the past 10 years is 98. Figure 1 shows firefighter deaths for the years 1977 through 2009, excluding the 340 firefighter deaths at the World Trade Center in 2001.

Of the 82 firefighters who died while on duty in 2009, 41 were volunteer firefighters, 31 were career firefighters, four were employees of federal land management agencies, four were contractors with federal land management agencies, one was an employee of a state land management agency, and one was a member of a race track fire safety crew.²

In 2009, there were six multiple-fatality incidents. Three firefighters were killed when their aircraft crashed while they were traveling to a wildland fire. The other five multiple-fatality incidents were all double-fatality cases. Two firefighters fell from an aerial platform while training. Two firefighters were killed when their apparatus crashed while they were operating on a wildland fire. The other six firefighters were killed during interior operations at three structure fires. More details will be presented throughout this report.

Analyses in this report examine the types of duty associated with firefighter deaths, the cause and nature of fatal injuries to firefighters, and the ages of the firefighters who died. They highlight deaths in intentionally-set fires and in motor vehicle-related incidents.³ A 10-year analysis showing trends in deaths while operating inside structure fires is included. Finally, the study presents summaries of individual incidents that illustrate important problems or concerns in firefighter safety.

Introduction

Each year, NFPA collects data on all firefighter fatalities in the U.S. that resulted from injuries or illnesses that occurred while the victims were on-duty. The term *on-duty* refers to being at the scene of an alarm, whether a fire or non-fire incident; while responding to or returning from an alarm; while

participating in other fire department duties such as training, maintenance, public education, inspection, investigation, court testimony or fund raising; and being on call or stand-by for assignment at a location other than at the firefighter's home or place of business.

On-duty fatalities include any injury sustained in the line of duty that proves fatal, any illness that was incurred as a result of actions while on duty that proves fatal, and fatal mishaps involving non-emergency occupational hazards that occur while on duty. The types of injuries included in the first category are mainly those that occur at a fire or other emergency incident scene, in training, or in crashes while responding to or returning from alarms. Illnesses (including heart attacks) are included when the exposure or onset of symptoms occurred during a specific incident or on-duty activity.

The victims include members of local career and volunteer fire departments; seasonal, full-time and contract employees of state and federal agencies who have fire suppression responsibilities as part of their job description; prison inmates serving on firefighting crews; military personnel performing assigned fire suppression activities; civilian firefighters working at military installations; and members of industrial fire brigades.

Fatal injuries and illnesses are included even in cases where death is considerably delayed. When the injury and the death occur in different years, the incident is counted in the year of the injury.

The NFPA recognizes that a comprehensive study of on-duty firefighter fatalities would include chronic illnesses (such as cancer or heart disease) that prove fatal and that arise from occupational factors. In practice, there is no mechanism for identifying fatalities that are due to illnesses that develop over long periods of time. This creates an incomplete picture when comparing occupational illnesses to other factors as causes of firefighter deaths. This is recognized as a gap the size of which cannot be identified at this time because of limitations in tracking the exposure of firefighters to toxic environments and substances and the potential long-term effects of such exposures.

The NFPA also recognizes that other organizations report numbers of duty-related firefighter fatalities using different, more expansive, definitions that include deaths that occurred when the victims were off-duty. (See, for example, <http://www.usfa.dhs.gov/fireservice/fatalities/index.shtm> and <http://www.firehero.org>.) Readers comparing reported losses should carefully consider the definitions and inclusion criteria used in any study.

Type of Duty

Figure 2 shows the distribution of the 82 deaths by type of duty. The largest share of deaths occurred while firefighters were operating on the fire ground (27 deaths). This total is well below the

average 34 deaths per year on the fire ground over the past 10 years, and half the average number of deaths in the first 10 years of this study (69 deaths per year from 1977 through 1986). Eighteen of the 27 deaths occurred at 15 structure fires. Deaths in structure fires are discussed in more detail later in this report. There were seven deaths at six wildland-related incidents, one death at a vehicle fire and one at a dumpster fire involving combustible metals. Thirteen of the 27 fire ground victims were career firefighters and twelve were volunteer firefighters. The other two victims worked on state and federal wildland firefighting crews. The average number of career firefighter deaths on the fire ground over the past 10 years is 12 deaths per year, while the average for volunteer firefighters is 16 deaths per year.

Twenty firefighters died while responding to or returning from emergency calls. It is important to note that not all deaths in this category are the result of crashes. Ten of the 20 deaths occurred in eight collisions or rollovers and eight were due to sudden cardiac events or stroke. One firefighter fell from the back of a responding rescue vehicle, and one firefighter died as a result of complications from surgery after injuring his knee when he slipped on ice during an EMS response. Thirteen of the victims were volunteer firefighters, three were career firefighters, three were contractors for a federal land management agency and one was a member of a race track fire safety crew. All crashes, the fall from the rescue vehicle and sudden cardiac deaths are discussed in more detail later.

Eleven deaths occurred during training activities. Two firefighters fell from an elevated aerial platform during a training exercise to familiarize firefighters with the new equipment, three firefighters collapsed after training runs or other physical fitness activities, two died while attending seminars or training sessions, one collapsed during pump operation training, one suffered a stroke during fitness training at the station, one was struck by a falling tree during tree felling training, and one firefighter fell while rappelling from a helicopter.

Ten firefighters died at non-fire emergencies, including five at the scene of motor vehicle crashes, three at emergency medical calls, one during a water rescue at a frozen pond and one while clearing a fallen tree from the road.

The remaining 14 firefighters died while involved in a variety of non-emergency-related on-duty activities. These activities included normal administrative or station duties (nine deaths), community events (two deaths), patrolling for downed trees (one death), fuel reduction in a wildland area (one death) and a marijuana eradication project (one death).

Cause of Fatal Injury or Illness

Figure 3 shows the distribution of deaths by cause of fatal injury or illness. The term *cause* refers to the action, lack of action, or circumstances that resulted directly in the fatal injury.⁴

Deaths resulting from overexertion, stress and related medical issues made up the largest category of fatalities. Of the 44 deaths in this category, 35 were classified as sudden cardiac deaths (usually heart attacks), five were due to strokes, one due to complications from hypothermia, one to an aneurysm and one from a blood clot. See the section below for more detail on sudden cardiac deaths. In the remaining incident, a seizure caused a firefighter to fall, striking his head on the floor.

The second leading cause of fatal injury was being struck by an object or coming into contact with an object. The 22 firefighters killed included 14 in motor vehicle crashes and four struck by motor vehicles. Those deaths are discussed in more detail in a separate section of this report. Two firefighters were struck by falling trees. One firefighter was struck by debris when a dumpster exploded. One firefighter was electrocuted at a motor vehicle crash when he came into contact with a downed power line when he slipped or fell while trying to avoid walking into it.

Nine firefighters were killed in jumps or falls. Two fell through the floor at a structure fire, two fell from an elevated aerial platform during training, one fell on ice, one fell from the back of a responding rescue vehicle, one fell off a parked fire department vehicle after a parade, one fell while rappelling from a helicopter, and one jumped from a third-story window when trapped by intense fire conditions.

The next leading cause of fatal injury was being caught or trapped, resulting in six deaths. Four of the six firefighters were trapped by fire progress in two separate fires; two of them died of smoke inhalation and two died of burns. One firefighter became trapped in a silo and was asphyxiated. One became pinned between the top guardrail on an elevating platform the bay door header while doing maintenance at a fire station.

One firefighter was shot by an agitated patient at an EMS call.

Nature of Fatal Injury or Illness

The term *nature* refers to the medical process by which death occurred and is often referred to as *cause of death* on death certificates and in autopsy reports.

Figure 4 shows the distribution of deaths by nature of fatal injury or illness. The largest number of fatalities, 35 deaths, were due to sudden cardiac death. The other major categories were internal trauma (28 deaths), stroke (five deaths), and asphyxiation (five deaths). There were three deaths due to

burns and two to blood clot or embolism. The remaining deaths included one each due to electrocution, gunshot wound, aneurysm and hypothermia.

Sudden Cardiac Deaths

Overall, sudden cardiac death is the number one cause of on-duty firefighter fatalities in the U.S. and almost always accounts for the largest share of deaths in any given year. (These are cases where the onset of symptoms occurred while the victim was on-duty and death occurred immediately or shortly thereafter.) The number of deaths in this category has fallen significantly since the early years of this study. From 1977 through 1986, an average of 60 on-duty firefighters a year suffered sudden cardiac deaths. The average fell to 44 a year in the 1990s and to under 40 in the past decade. In spite of this reduction, sudden cardiac death still accounted for 39 percent of the on-duty deaths in the last five years, and 42 percent in 2009 alone.

For 19 of the 35 victims of sudden cardiac events in 2009, post mortem medical documentation showed that eight had severe arteriosclerotic heart disease, five were hypertensive, two were diabetic, and eight were reported to have had prior heart problems -- such as prior heart attacks, bypass surgery or angioplasty/stent placement. (Some of the victims had more than one condition.) Other risk factors were represented among the victims of sudden cardiac death, including obesity, smoking and family history. Medical documentation was not available for the other 16 firefighters.

NFPA has several standards that focus on the health risks to firefighters. For example, NFPA 1582, *Comprehensive Occupational Medical Program for Fire Departments*, outlines for fire departments the procedures for screening candidate firefighters and handling health problems that might arise during an individual's fire service career. NFPA 1500, *Fire Department Occupational Safety and Health Program*, calls for fire departments to establish a firefighter health and fitness program based on NFPA 1583, *Health-Related Fitness Programs for Fire Fighters*, and requires that firefighters meet the medical requirements of NFPA 1582.

Information on developing a wellness-fitness program is available from other organizations, for example, the IAFC/IAFF Fire Service Joint Labor Management Wellness-Fitness Initiative (http://www.iafc.org/associations/4685/files/healthWell_WFI3rdEdition.pdf) and the National Volunteer Fire Council's Heart-Healthy Firefighter Program (<http://www.healthy-firefighter.org>). The Heart-Healthy Firefighter Program was launched in 2003 to address heart attack prevention for all firefighters and EMS personnel, through fitness, nutrition and health awareness.

An important part of this NVFC program includes health screenings that they make available annually at several fire service trade shows around the country. The purpose of the program is to lower the incidence of cardiac-related problems in the fire service by educating firefighters and their families about nutrition, fitness and heart disease prevention. While those screenings provide valuable information to the individuals tested, they've also collected data that provides a disturbing picture of the health status of many of the nation's firefighters. Since 2003, the program has screened almost 10,000 firefighters, both career and volunteer, for blood pressure, cholesterol, body fat and glucose.

- Cholesterol screening done from 2003 through 2007 found high or borderline-high levels (greater than or equal to 200 mg/dl) in 37.0 percent of the 7,904 firefighters tested.
- Blood pressure screenings from 2005 through 2007 found that 6.2 percent of the tested firefighters had Stage 2 hypertension; 28.9 percent had Stage 1 hypertension; and 48.0 percent were prehypertensive. Only 16.9 percent had normal blood pressure readings.
- Almost all of the 5,065 firefighters tested for glucose (non-fasting) in 2006 and 2007 were found to be in the desirable range (less than 140 mg/dl), with only 2.7 percent found to be diabetic (greater than or equal to 200 mg/dl) and 5.9 percent pre-diabetic (between 140 and 199 mg/dl).
- Of the almost 2,000 firefighters tested for body fat in 2005, 44.7 percent were found to be obese (defined as 25 percent or more of body fat for men and 32 percent or more for women).

Results of the testing in 2008 were reported in a slightly different format.

- Of the approximately 1,650 firefighters tested at four shows, 47.5 percent were determined to have a high overall coronary risk rating, based on the National Institute of Health's "National Cholesterol Education Program."
- Cholesterol screening showed that 5.8 percent of the tested firefighters were at high risk levels (greater than or equal to 240 mg/dl) and 21.4 percent were at moderate risk (200-239 mg/dl).
- Blood pressure screenings found that 27.9 percent of the tested firefighters had high blood pressure; and 49.6 percent were prehypertensive. The remaining 22.5 percent had desired or ideal blood pressure readings.
- Body fat was measured again in 2008, and 41.5 percent of the tested firefighters were found to be at high risk and another 25.1 were found to be overweight.

Only blood pressure was screened at a single show in 2009.

- Of the 137 firefighters tested there, 2.2 percent had Stage 2 hypertension; 20.4 percent had Stage 1 hypertension; and 54.0 percent were prehypertensive. Only 23.4 percent had normal blood pressure readings.

Source: National Fire Protection Association, Quincy MA 02169, June 2010

Through this program, many firefighters have been tested more than once, have come to understand their personal level of risk, and have adopted a more heart-healthy lifestyle.

Other efforts are in place in an attempt to address this health problem. The 2010 Fire/EMS Safety, Health and Survival Week was held in June, with the theme, "Fit for Duty." The event, co-sponsored by IAFF and IAFC, focused on nutrition and fitness, stress management, smoking and smokeless tobacco cessation, alcohol and other drugs, infectious diseases and suicide prevention.

Ages of Firefighters

The firefighters who died in 2009 ranged in age from 18 to 78, with a median age of 47 years. Three were over age 70. Figure 5 shows the distribution of firefighter deaths by age and whether the cause of death was sudden cardiac death or not.

Sudden cardiac death accounts for a higher proportion of the deaths among older firefighters, as might be expected. More than half of the firefighters over age 40 who died in 2009 died of heart attacks or other cardiac events. The youngest victim of sudden cardiac death was aged 24.

Figure 6 shows death rates by age, using career and volunteer firefighter fatality data for the five-year period from 2005 through 2009 and estimates of the number of career and volunteer firefighters in each age group from the NFPA's 2007 profile of fire departments (the mid-year in the range).⁵

The lowest death rates were for firefighters in their 20s. Their death rate was half the all-age average. Firefighters in their 30s had a death rate two-thirds the all-age average. The rate for firefighters aged 60 and over was 3-1/2 times the average. Firefighters aged 50 and over accounted for two-fifths of all firefighter deaths over the five-year period, although they represent only one-fifth of all career and volunteer firefighters in the U.S.

Fire Ground Deaths

Of the 27 fire ground fatalities, 11 were due to sudden cardiac death, seven to internal trauma, five to asphyxiation, two to burns and one each to stroke and aneurysm.

Figure 7 shows the distribution of the 27 fire ground deaths by fixed property use. Seven of the firefighters were killed on five wildland fires and one prescribed burn. Three of the victims suffered fatal cardiac events, two were killed in separate aircraft crashes over wildland fires, and two were killed when their fire department apparatus went off the road and overturned while they were trying to escape the fire.

Sudden cardiac death claimed the life of one firefighter during operations at a vehicle fire. One

firefighter was killed outside a metal products manufacturing plant when water applied on a dumpster fire caused it to explode. A trainee firefighter died of an aneurysm while working at an outside fire involving debris from the demolition of a structure.

Nine of the 17 firefighter deaths at structure fires occurred in residential properties. Fires in one- and two-family dwellings killed seven of the nine and two died in fires in apartment buildings. Four firefighters were killed in fires in vacant houses. Two firefighters were killed in a fire in a delicatessen, one died at a restaurant fire and one was killed at a fire involving a grain silo.

None of the structures had an automatic fire suppression system.

To put the hazards of firefighting in various types of structures into perspective, the authors examined the number of fire ground deaths per 100,000 structure fires by property use. Estimates of the structure fire experience in each type of property were obtained from the NFPA's annual fire loss studies from 2004 through 2008 (the 2009 results are not yet available) and from the updated firefighter fatality data for the corresponding years. The results are shown in Figure 8.

This figure illustrates that, although many more firefighter deaths occur at residential structure fires than at fires in any other type of structure, fires in some nonresidential structures, such as mercantile, public assembly and manufacturing properties, are more hazardous to firefighters, on average. There were 7.7 fire ground deaths per 100,000 nonresidential structure fires from 2004 through 2008, compared to 3.8 deaths per 100,000 residential structure fires. The highest death rates over the five-year period occurred in stores and offices. This is a reflection, in part, of the nine deaths that occurred at a single store fire in 2007. The low rate in health care and correctional properties may reflect the fact that these occupancies are among the most regulated and most-frequently inspected and that their occupants are among the most likely to call the fire department to report fires while the fires are still in their early stages. The low rate in that five-year period for storage properties, which includes garages at dwellings, reflects the relatively small number of fatalities that have occurred in such structures in recent years. In contrast, the slightly higher rate in educational properties is a result of a single fatality over the five-year period in a type of property that has a very low occurrence of reported fires. (Fires in vacant structures are not shown separately in this analysis, as was done in previous years, because of changes in the methodology used to collect fire incident information. They are included in the category for the intended use of the structure; for example, deaths in vacant houses are included in the residential fire category.)

Vehicle-Related Incidents

In 2009, 14 firefighters died in 11 vehicle crashes (including five firefighters killed in three aircraft crashes). In addition to those deaths, four other firefighters were struck and killed by vehicles and two fell from moving apparatus.

Eight of the 14 firefighters were killed in six crashes while responding to incidents and two were killed while returning from incidents.

- Two pilots and a crew chief were killed when their aircraft crashed into a mountain in dense fog while they were traveling to a wildland fire.
- A firefighter responding to a grass fire in a wildland fire apparatus struck another responding vehicle head-on when smoke over the road caused the other driver to cross the center line. The victim was not wearing a seatbelt and was not ejected.
- A firefighter responding as passenger in a wildland fire apparatus was ejected and killed when the brakes failed and the driver of the 1964 vehicle was not able to stop at an intersection. He swerved to avoid traffic, causing the apparatus to overturn and strike a utility pole. The victim was not wearing a seatbelt. Factors cited in the crash included inadequate inspection, maintenance and testing of the vehicle, inadequate driver training and driver inexperience, and minimal safety features on the apparatus.
- A fire chief responding in his fire department vehicle at excessive speed in light rain was killed when his vehicle struck a tree as he swerved to avoid a vehicle that pulled out of an intersecting road. The other driver had stopped at the intersection, but the view of the other road was obstructed and the victim was not sounding his siren. He was wearing his seatbelt and was not ejected.
- A firefighter driving his personal vehicle to a car fire was killed when he struck a tree. Wet roads and speeding were cited as factors in the crash. He was not wearing a seatbelt and was ejected.
- A firefighter responding to a vehicle fire as passenger was killed when his rescue vehicle struck another vehicle and overturned. The driver of the other vehicle had appeared to pull over but then pulled in front of the rescue to make a left turn as the driver of the rescue attempted to pass. Seatbelt use was not reported, but the victim was not ejected.
- The officer in a ladder truck returning from an EMS call was killed when the truck's brakes failed on a hill and the truck crashed through a brick wall and into a building. The victim was not wearing a seatbelt and was not ejected.

- The driver of a water tender (tanker) struck a utility pole after he lost control of the vehicle on a steep hill while returning from a structure fire. There were no seatbelts in the 1970 apparatus, and the victim was ejected. Operator error or a medical emergency could have been the cause of the loss of control and crash.

The remaining three fatal crashes occurred on the scene at wildland fires:

- The driver and passenger in a fire department pickup truck died of traumatic injuries and smoke inhalation when they drove off the side of a mountain while trying to escape the fire. The pair had been attempting to set back fires when they were overrun and had to evacuate. Investigators believe that obscured visibility may have been a factor in driving off the road. The passenger was not wearing a seatbelt and was ejected. It could not be determined if the driver was wearing a seatbelt, but he was not ejected.
- A state forestry pilot flying as air attack supervisor was killed when he crashed into a field. The probable cause of the crash was determined to be the pilot's failure to maintain adequate airspeed, resulting in a stall at low altitude.
- A contract pilot dropping retardant from his air tanker was killed when he crashed into rising terrain. No other details are available on this fire yet, either.

Of the nine deaths in road vehicles mentioned above, six of the victims were not wearing seatbelts (four were ejected and two were not ejected), one was wearing his seatbelt, and no information on seatbelt use was available for two of the victims (neither of whom was ejected). Excessive speed was a factor in at least two of the eight crashes. Other factors reported were driver inexperience, driver inattention, weather conditions, lack of maintenance of vehicles and minimal safety features on older apparatus.

Four firefighters were struck by vehicles.

- A firefighter was run over at a fire scene as he guided a pumper that was backing up. The area was well-lit and the victim was wearing turnout gear with reflective trim and lettering. The driver, who had been maintaining eye contact with the victim, may have been momentarily distracted by a passing vehicle. The victim might not have realized how close he was to the vehicle and might have lost his footing.
- In rain and poor visibility, a firefighter wearing a safety vest while clearing a tree from a roadway was struck by a car that came around a curve over a rise of a hill. The driver saw the headlights, flashers and yellow light on the firefighter's vehicle and slowed down but never saw the victim.

- A firefighter working at the scene of a motor vehicle crash collapsed for an unknown reason and was run over by a fire department apparatus that was backing up. No other details were reported.
- In the fourth incident, as a firefighter was assisting the victim of a crash, a truck crested the hill and could not stop on the ice, went off the road and struck him.

Two firefighters fell from moving vehicles. One of them fell from a helicopter during a rappel training exercise, due to improper rigging of the equipment. The other fell off the back of a race track safety vehicle as it responded to a crash on the track.

NFPA publishes several standards related to road safety issues. *NFPA 1002, Standard on Fire Apparatus Driver/Operator Professional Qualifications*, identifies the minimum job performance requirements for firefighters who drive and operate fire apparatus, in both emergency and nonemergency situations. *NFPA 1451, Standard for a Fire Service Vehicle Operations Training Program*, provides for the development of a written vehicle operations training program, including the organizational procedures for training, vehicle maintenance, and identifying equipment deficiencies. *NFPA 1911, Standard for the Inspection, Testing, Maintenance and Retirement of In-Service Automotive Fire Apparatus*, details a program to ensure that fire apparatus are serviced and maintained to keep them in safe operating condition. *NFPA 1901, Automotive Fire Apparatus*, addresses vehicle stability to prevent rollovers, and gives manufacturers options on how to provide it. New vehicles will have their maximum speed limited, based on their weight, and will have vehicle data recorders to monitor, among other things, acceleration and deceleration, and seatbelt use.

The provisions of NFPA 1500 include requirements that operators successfully complete an approved driver training program, possess a valid driver's license for the class of vehicle, and operate the vehicle in compliance with applicable traffic laws. All vehicle occupants must be seated in approved riding positions and secured with seatbelts before drivers move the apparatus, and drivers must obey all traffic signals and signs and all laws and rules of the road, coming to a complete stop when encountering red traffic lights, stop signs, stopped school buses with flashing warning lights, blind intersections and other intersection hazards, and unguarded railroad grade crossings. Passengers are required to be seated and belted securely and must not release or loosen seatbelts for any reason while the vehicle is in motion.

In related efforts, the USFA has formed partnerships with the IAFF, NVFC and IAFC to focus attention on safety while responding in emergency apparatus. Details can be found at www.usfa.dhs.gov/fireservice/research/safety/vehicle.shtm.

The focus of vehicle safety programs should not be exclusively on fire department apparatus, since, over the years, personal vehicles have been the vehicles most frequently involved in road crashes. NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, includes a requirement that when members are authorized to respond to incidents or to fire stations in private vehicles, the fire department must establish specific rules, regulations, and procedures relating to the operation of private vehicles in an emergency mode.

Requirements are also in effect for emergency personnel operating on roadways. In late 2008, Federal Rule 23 C.F.R. Part 634 – Worker Visibility (High-Visibility Vests) became law, requiring anyone working on a federally-funded roadway to wear an ANSI 107-compliant high-visibility vest. An interim rule was also published that created an exemption for firefighters and others engaged on such roadways that allows them to wear NFPA-compliant retroreflective turn-out gear when directly exposed to flames, heat and hazardous material. NFPA 1500 requires firefighters working on traffic assignments where they are endangered by motor vehicle traffic to wear clothing with fluorescent and retroreflective material. The 2009 edition of NFPA 1901 requires that ANSI 207-compliant breakaway high-visibility vests be carried on all new fire apparatus. Advice on compliance with the new Federal rule can be found at: [http://www.respondersafety.com/Articles/New_Federal_Rule_23_CFR_Part_634__ Worker_Visibility_High-Visibility_Vests_.aspx](http://www.respondersafety.com/Articles/New_Federal_Rule_23_CFR_Part_634__Worker_Visibility_High-Visibility_Vests_.aspx). NFPA 1901 also requires reflective striping for improved visibility on new apparatus and a reflective chevron on the rear of fire apparatus. Advice on how to improve visibility of existing apparatus can be found at: <http://www.respondersafety.com/MarkedAndSeen.aspx>.

Career/Volunteer Comparison

The distribution of deaths of career and volunteer firefighters from local fire departments is shown in Figure 9. At 41, the number of deaths of volunteer firefighters in 2009 is the lowest it's been since 1994. Deaths among volunteers has tended to fluctuate between the mid-40s and the mid-60s. With the exception of 2007, when nine career firefighters were killed in a single incident, the number of on-duty deaths of career firefighters annually continues its plateau of approximately 30 deaths each year. (There were 31 in 2009.)

A breakdown of the fatality experience of the 72 career and volunteer firefighters killed in 2009 is shown in Table 1.

Other Findings

There were six deaths at five intentionally-set fires in 2009. Three were sudden cardiac deaths – two at fires in vacant houses and one at a grass fire. Two firefighters were killed in an apparatus crash on an intentionally-set wildland fire and one firefighter was run over by a fire department vehicle at the scene of a vacant house fire. From 2000 through 2009, 60 firefighters (6.1 percent of all on-duty deaths) died in connection with intentionally-set fires. The number of these deaths annually has been dropping since 1985.

Over the past 10 years, 29 firefighter deaths have resulted from false calls, including malicious false alarms and alarm malfunctions. In 2009, sudden cardiac death claimed the lives of two firefighters – one of them shortly after returning from a system malfunction at an apartment building and the other while returning from the false report of a motor vehicle crash.

Summary

There were 82 on-duty firefighter deaths in 2009; the lowest total since 1993 and the third lowest total since NFPA began this study in 1977. The sharp drop from the number of deaths in 2008 and 2007 is explained only in part by the presence in those years of single incidents that resulted in nine deaths.

Another promising development is the low number of deaths in road crashes in 2009. There were nine deaths in crashes of road vehicles in 2009. This is the lowest total since 1983, when there were only six. Over the past 10 years, the number of deaths in road vehicle crashes has averaged 15 a year, ranging from this year's low of nine to a high of 25 in 2003 and 2007.

Although a significant decline in the death total and in the category that regularly accounts for the second largest share of deaths (crashes) is a positive finding, a single year's results cannot be interpreted as a trend.

As in most years, the number one cause of on-duty firefighter fatalities was sudden cardiac death. The number of such deaths has been trending downwards since the late 1970s, but they have leveled off at under 40 deaths while on-duty each year and continue to account for approximately 40 percent of the deaths annually.

This study focuses on the fire deaths that are directly associated with specific on-duty activities, and does not track the effects of long-term exposure to toxic products that might occur during an individual's time in the fire service. The U.S. Fire Administration and NIOSH recently announced that NIOSH researchers will undertake a multi-year study to examine the cancer risk of firefighters, using health records of approximately 18,000 current and retired career firefighters from suburban and large

city fire departments. More information about the project is available on the USFA and NIOSH websites.

References

1. The NFPA's files for firefighter on-duty fatal injuries are updated continually for all years.
2. For this report, the term *volunteer* refers to any firefighter whose principal occupation is not that of a full-time, paid member of a fire department. The term *career* refers to any firefighter whose occupation is that of a full-time, paid fire department member.
3. For this report, the term *motor vehicle-related incident* refers to motor vehicle collisions (including aircraft and boats) and rollovers, as well as to incidents such as falls from or struck by vehicles where the involvement of the vehicle played an integral role in the death.
4. The categories for cause of injury and nature of injury are based on the 1981 edition of NFPA 901, *Uniform Coding for Fire Protection*.
5. Michael J. Karter, Jr., "U.S. Fire Department Profile Through 2007," NFPA Fire Analysis and Research Division, Quincy, Massachusetts, November 2008.

Credits

This study is made possible by the cooperation and assistance of the United States fire service, the Public Safety Officers' Benefits Program of the Department of Justice, CDC's National Institute for Occupational Safety and Health, the United States Fire Administration, the Forest Service of the U.S. Department of Agriculture, and the Bureau of Indian Affairs and the Bureau of Land Management of the U.S. Department of the Interior. The authors would also like to thank Carl E. Peterson, retired from NFPA's Public Fire Protection Division, and Thomas Hales, MD, MPH, of CDC-NIOSH, for their assistance on the study.

U.S. Department of Justice Death, Disability and Educational Benefits for Public Safety Officers and Survivors

Line of duty deaths: The Public Safety Officers' Benefits (PSOB) Act, signed into law in 1976, provides a federal death benefit to the survivors of the nation's federal, state, local and tribal law enforcement officers, firefighters, and rescue and ambulance squad members, both career and volunteer, whose deaths are the direct and proximate result of a traumatic injury sustained in the line of duty. The Act was amended in 2000 to include FEMA employees performing official, hazardous duties related to a declared major disaster or emergency. Effective December 15, 2003, public safety officers are covered for line-of-duty deaths that are a direct and proximate result of a heart attack or stroke, as defined in the Hometown Heroes Survivors' Benefits Act of 2003.

A 1988 amendment increased the amount of the benefit from \$50,000 to \$100,000 and included an annual cost-of-living escalator. On October 1 of each year, the benefit changes as a result. The enactment of the USA PATRIOT bill in 2001 increased the benefit to \$250,000. The current benefit is \$311,810, tax free.

A decedent's spouse and minor children usually are the eligible beneficiaries. Generally, in cases in which the public safety officer had no surviving spouse or eligible children, the death benefit is to be awarded to either the individual most recently designated as beneficiary for PSOB benefits with the officer's public safety agency, organization, or unit, or, if there is no designation of beneficiary of PSOB benefits on file, then to the individual designated as beneficiary under the most recently executed life insurance policy on file at the time of death. (*See* 42 U.S.C. § 3796(a)(4) for specific details.) If no individuals qualify under 42 U.S.C. § 3796(a)(4), then the benefit is paid to the public safety officer's surviving parents.

Line of duty disability: In 1990, Congress amended the PSOB benefits program to include permanent and total disabilities that occur on or after November 29, 1990. The amendment covers public safety officers who are permanently unable to perform any gainful employment in the future. PSOB is intended for those few, tragic cases where an officer survives a catastrophic, line of duty injury. Only then, in the presence of the program's statutory and regulatory qualifying criteria, will PSOB's disability benefit be awarded. The bill's supporters anticipated that few PSOB disability claims would be eligible annually.

Public Safety Officers' Educational Assistance Program (PSOEA): An additional benefit, signed into law in October 1996 and amended in 1998, provides an educational assistance allowance to the spouse and children of public safety officers whose deaths or permanent and total disabilities qualify under the PSOB Act. This benefit is provided directly to dependents who attend a program of education at an eligible education institution and are the children or spouses of covered public safety officers. It is retroactive to January 1, 1978, for beneficiaries who have received or are eligible to receive the PSOB death benefit. Students may apply for PSOEA funds for up to 45 months of full-time classes. As of October 1, 2009, the maximum benefit a student may receive is \$925 per month of full-time attendance.

Further benefits information: To initiate a claim for death benefits, to receive additional information on filing a disability claim or to receive additional information about coverage, call, email, or write the Public Safety Officers' Benefits Office, Bureau of Justice Assistance, Office of Justice Programs, U.S. Department of Justice, 810 7th Street, N.W., Washington DC 20531. The telephone number is (888) 744-6513 and the email address is ASKPSOB@usdoj.gov. PSOB death claims can now be filed online as well, at: <https://www.psob.gov>. Please note that the PSOB Office "Call Center" is now available to take calls Monday through Friday from 7:00 AM until 7:00 PM.

Table 1
Comparison of On-Duty Deaths Between
Career and Volunteer Firefighters, 2009*

	Career Firefighters		Volunteer Firefighters	
	Number of Deaths	Percent of Deaths	Number of Deaths	Percent of Deaths
Type of duty				
Operating at fire ground	13	42 %	12	29 %
Responding to or returning from alarms	3	10	13	32
Operating at non-fire emergencies	0	0	10	24
Training	6	19	3	7
Other on-duty	9	29	3	7
TOTALS	31	100 %	41	100 %
Cause of fatal injury				
Exertion/stress/other related	18	58 %	25	61 %
Struck by or contact with object	5	16	9	22
Fell/jumped	6	19	1	2
Caught or trapped	2	6	4	10
Assault	0	0	1	2
Exposure to electricity	0	0	1	2
TOTALS	31	100 %	41	100 %
Nature of fatal injury				
Sudden cardiac death	12	39 %	22	54 %
Internal trauma	10	32	10	24
Stroke/aneurysm	3	10	3	7
Asphyxiation (including smoke inhalation)	2	6	3	7
Burns	2	6	0	0
Blood clot/embolism	1	3	1	2
Hypothermia	1	3	0	0
Gunshot wounds	0	0	1	2
Electrocution	0	0	1	2
TOTALS	31	100 %	41	100 %
Rank				
Firefighter	20	65 %	26	63 %
Company officer	10	32	3	7
Chief officer	1	3	12	29
TOTALS	31	100 %	41	100 %

Source: National Fire Protection Association, Quincy MA 02169, June 2010

	Career Firefighters		Volunteer Firefighters	
	Number of Deaths	Percent of Deaths	Number of Deaths	Percent of Deaths
Ages of Firefighters				
All deaths				
20 and under	0	0 %	1	2 %
21 to 25	2	6	1	2
26 to 30	2	6	2	5
31 to 35	3	10	3	7
36 to 40	5	16	1	2
41 to 45	8	26	6	15
46 to 50	4	13	3	7
51 to 55	4	13	6	15
56 to 60	3	10	7	17
61 to 65	0	0	5	12
66 to 70	0	0	3	7
Over 70	0	0	3	7
TOTALS	31	100 %	41	100 %

Ages of Firefighters
Sudden cardiac deaths only

21 to 25	1	8 %	0	0 %
31 to 35	1	8	0	0
36 to 40	1	8	0	0
41 to 45	5	42	3	14
46 to 50	1	8	2	9
51 to 55	2	17	4	18
56 to 60	1	8	6	27
61 to 65	0	0	4	18
over 70	0	0	3	14
TOTALS	12	100 %	22	100 %

Fire ground deaths by fixed property use

Dwellings and apartments	6	46 %	3	25 %
Wildland/prescribed burns	3	23	2	17
Vacant dwellings	2	15	2	17
Stores	2	15	0	0
Outside fires	0	0	2	17
Storage	0	0	1	8
Restaurant	0	0	1	8
Vehicle	0	0	1	8
TOTALS	13	100 %	12	100 %

	Career Firefighters		Volunteer Firefighters	
	Number of Deaths	Percent of Deaths	Number of Deaths	Percent of Deaths
Years of service				
5 or less	7	23 %	9	22 %
6 to 10	4	13	5	12
11 to 15	4	13	4	10
16 to 20	3	10	4	10
21 to 25	5	16	2	5
26 to 30	7	23	6	15
over 30	1	3	9	22
Not reported	0	0	2	5
TOTALS	31	100 %	41	100 %
Attributes of fire ground deaths**				
Intentionally-set fires	3		3	
Search and rescue operations	4		1	
Motor vehicle crashes	4		5	
False alarms	1		1	

* This table does not include the 10 victims who were employees of or contractors for state or federal land management agencies, or members of private firefighting crews.

** Because these attributes are not mutually exclusive, totals and percentages are not shown.

Figure 1
On-Duty Firefighter Deaths - 1977-2009

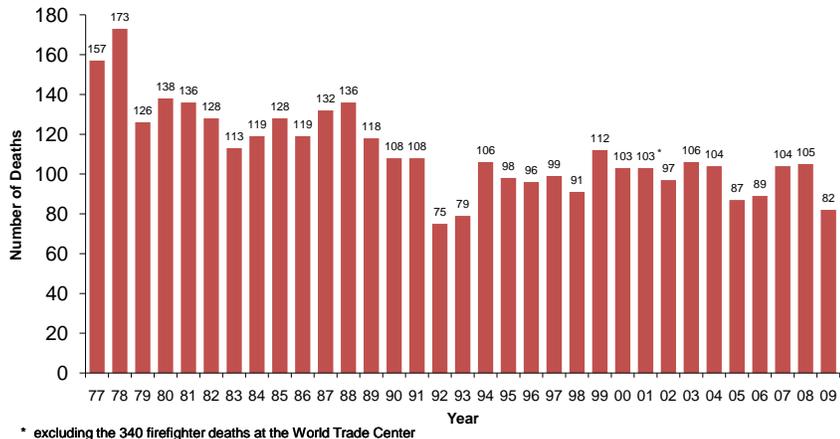


Figure 2
Firefighter Deaths by Type of Duty - 2009

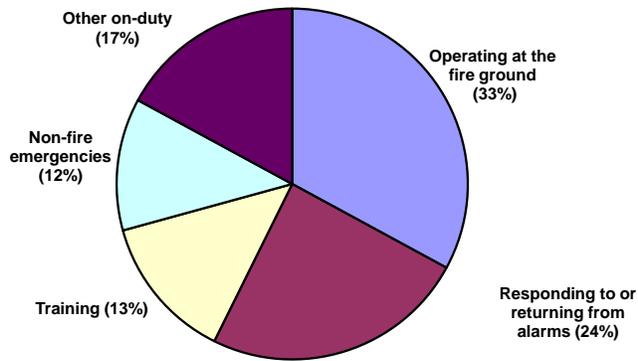


Figure 3
Firefighter Deaths by Cause of Injury -- 2009

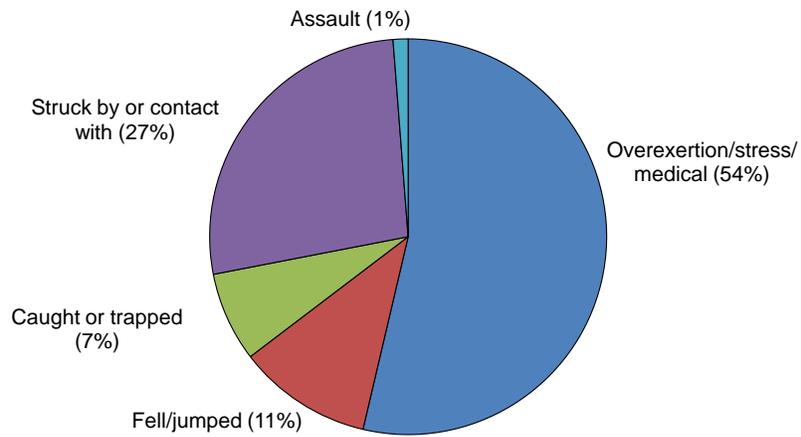


Figure 4
Firefighter Deaths by Nature of Injury -- 2009

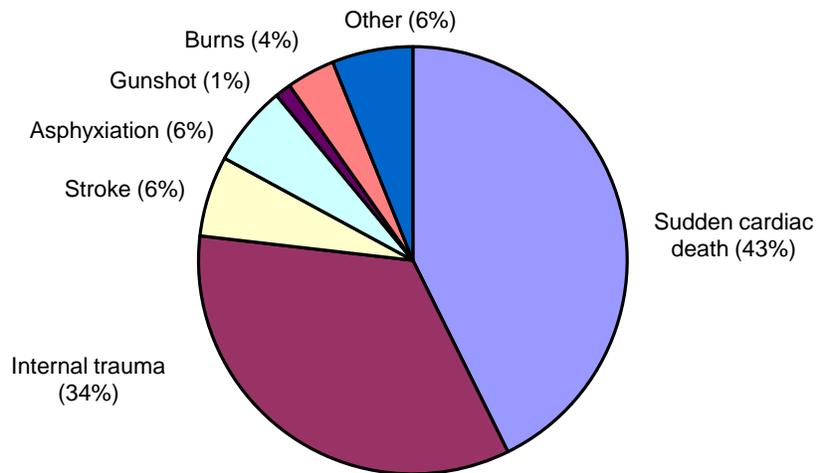


Figure 5
Firefighter Deaths by Age and Cause of Death -- 2009

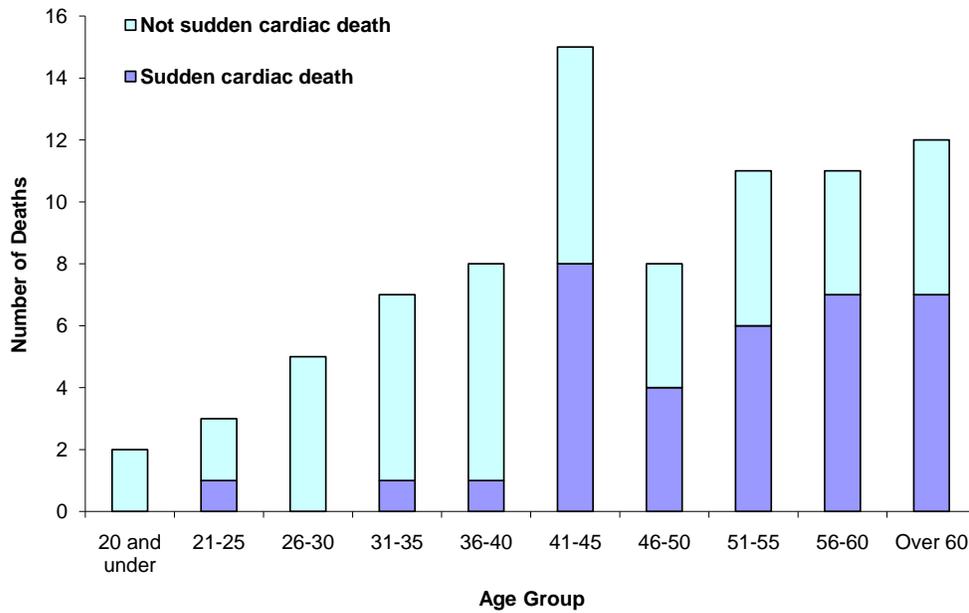


Figure 6
On-Duty Death Rates per 10,000 Career and Volunteer Firefighters
2005-2009

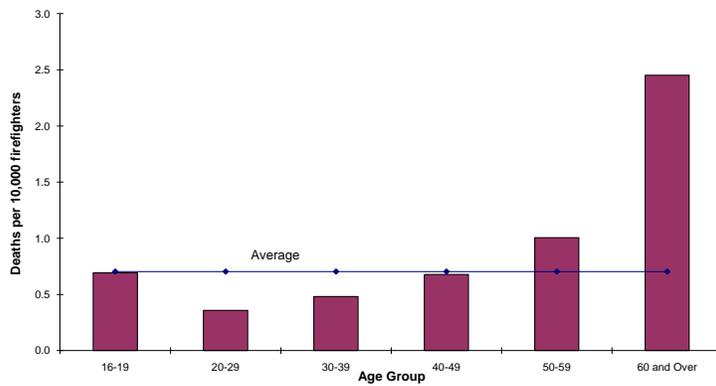
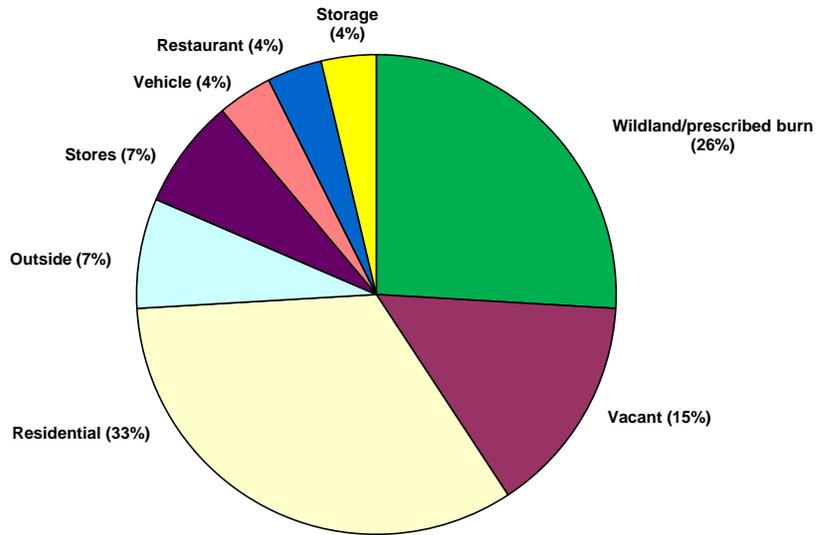


Figure 7
Fire Ground Deaths by Fixed Property Use -- 2009*



* There were 27 deaths on the fire ground in 2009.

Figure 8
On-Duty Fire Ground Deaths per 100,000 Structure Fires 2004-2008

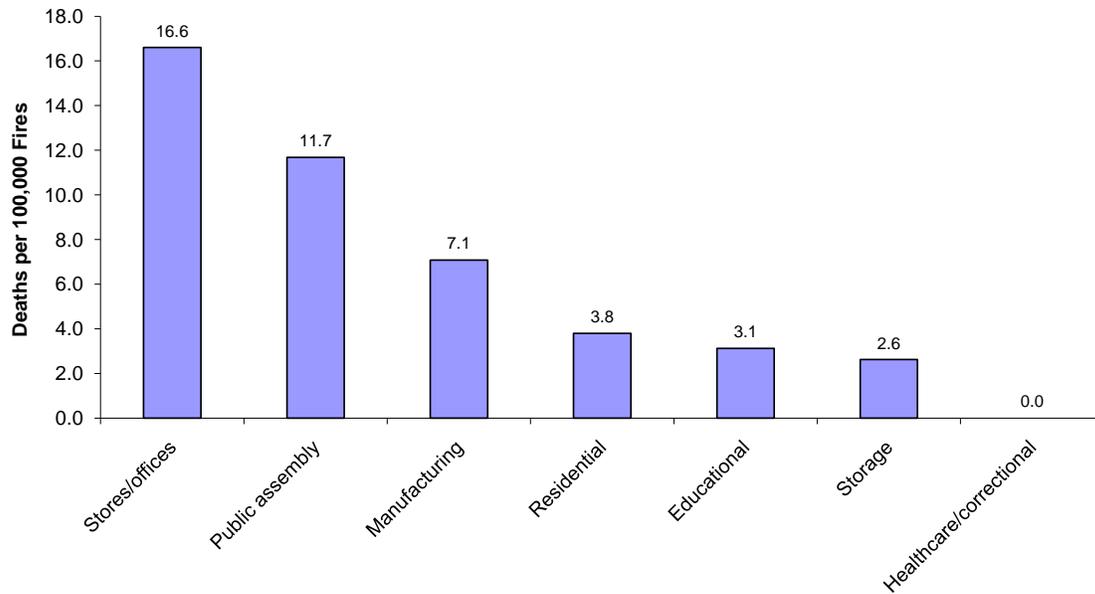
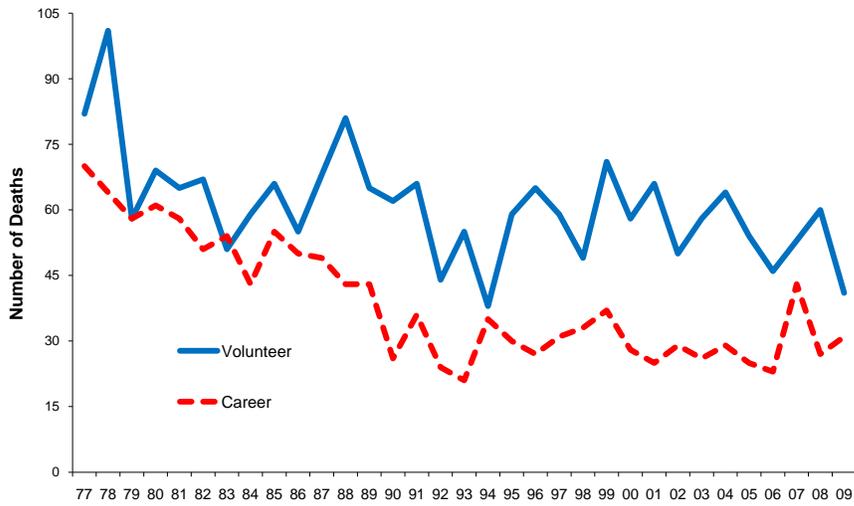


Figure 9
Career and Volunteer Firefighter Deaths
1977 - 2009*



* excluding the 340 firefighter deaths at the World Trade Center in 2001